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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-9. (Cancelled)

10. (Currently Amended) A method of operating a harvesting machine comprising the steps of:

continuously optimizing a stochastic parameter that characterizes the instantaneously prevailing readiness with which the harvesting machine processes crop; and

continuously adjusting a performance variable of the harvesting machine in dependence on the instantaneous, optimized value of said parameter, in order to optimize a load of the harvesting machine so as to keep a value y(t) indicative of the effectiveness of said harvesting machine below a predetermined value, wherein the step of adjusting a performance variable of the harvesting machine occurs in dependence on the output of an inverted form of a yield loss estimation function:

$\dot{y}(t,\vartheta) = \exp(\vartheta u(t)) - 1$ ~~(B)~~

wherein:

$\dot{y}(t,\vartheta)$ is the estimated yield loss;

t is for time;

ϑ is a stochastic parameter;

$u(t)$ is the feedrate of crop; and

exp is an exponential function.

11. (Original) A method according to Claim 10, wherein:

processing the crop comprises separating useable crop parts from other plant matter;

optimizing the load of the harvesting machine comprises optimizing the feedrate u(t) of crop into the harvesting machine; and

the effectiveness value comprises losses y(t) of useable crop parts.

12. (Currently Amended) A method according to Claim 10, wherein the step of continuously optimizing a stochastic parameter includes the step of recursively calculating the optimized parameter value in accordance with the following algorithm:

$$\hat{\vartheta}(t) = f(\hat{\vartheta}(t-1), z(t, \hat{\vartheta}(t-1))) \qquad - (A)$$

wherein:

$\hat{\vartheta}(t)$ is the optimized stochastic parameter value at time t; and

$z(t, \hat{\vartheta}(t))$ is an error prediction function.

13. (Cancelled)

14. (Previously Presented) A method according to Claim 10, wherein adjusting a performance variable comprises adjusting a travel speed of said harvesting machine or an actual cutting width of a header of said harvesting machine.

15. (Previously Presented) A method of mapping one or more field lots for variations in a stochastic parameter that characterizes the instantaneously prevailing readiness with which crop is processed in a harvesting machine, the method comprising the steps of:

operating a harvesting machine to harvest crop in a field lot;

simultaneously measuring a machine load and the machine effectiveness and determining the position of the machine in the field lot;

storing data indicative of the position of the harvesting machine at time t;

using the measured machine load data u(t), and machine effectiveness data y(t) in an optimization of said parameter; and

mapping optimized parameter values obtained from the step of using the measured machine load data u(t) and machine effectiveness data y(t) in an optimization of said parameter; so as to produce a parameter map of the field lot.

16. (Currently Amended) A method according to Claim 15, wherein the step of using the measured machine load data u(t), and machine effectiveness data y(t) in an optimization of said parameter includes the step of recursively calculating the optimized parameter value in accordance with the following algorithm:

$$\hat{\vartheta}(t) = f(\hat{\vartheta}(t-1), \varepsilon(t, \hat{\vartheta}(t-1))) \qquad \text{- (A)}$$

wherein:

$\hat{\vartheta}(t)$ is the optimized stochastic parameter value at time t; and

$\varepsilon(t, \hat{\vartheta}(t))$ is an error prediction function.

17-21. (Cancelled)